



MODELING THE ROUGHNESS PROGRESSION ON KANSAS PORTLAND CEMENT CONCRETE (PCC) PAVEMENTS

Report Number: K-TRAN: KSU-00-6

By

Victoria Felker, Dr. Yacoub M. Najjar, Ph.D., P.E., and Mustaque Hossain, Ph.D., P.E.,
All of Kansas State University

RESEARCH

Introduction

Long-term prediction of the performance and durability of pavement represents a critical and vital issue in the life-cycle cost analysis used in the Kansas Department of Transportation's pavement surface-type selection process

Project Objective

This project's objective is to develop an accurate prediction of roughness progression on Portland cement concrete pavements that could be used in the place of the current model, which is based on the 1993 AASHTO pavement surface guidelines.

Project Description

Dynamic artificial neural network (ANN) and statistical analyses were used to develop roughness prediction models for newly-constructed jointed concrete pavements. Construction and materials data, as well as traffic and climate data were used in the model development process.

Project Results

A time-dependent ANN-based roughness prediction model, developed in a two-stage training approach, was able to predict roughness progression reasonably well, with $R^2 = 0.90$). The model was validated using data from two "future" years. The impact of various key input parameters was assessed in a sensitivity analysis. Multiple-regression statistical analyses were also used to develop a model which was used to project the roughness values 20 and 30 years into the future.

Report Information

For technical information on this report, please contact: Mustaque Hossain, Ph.D., P.E, Associate Professor, Kansas State University, Department of Civil Engineering, 2118 Fiedler Hall, Manhattan, Kansas 66505-5000; Phone: 785-532-1576; Fax: 785-532-7717; e-mail: mustak@ksu.edu.

For a copy of the full report, please contact: KDOT Library; 2300 SW Van Buren Street, Topeka, Kansas 66611-1195; Phone: 785-291-3854; Fax: 785-296-2526; e-mail: library@ksdot.org.